UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/685,008	10/06/2000	Shingo Nozawa	862.C2029	2928

5514 7590 08/26/2004

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER	
CHEN, WENPENG	

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/685,008	NOZAWA ET AL.	
	Examiner	Art Unit	
	Wenpeng Chen	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8-16,24-32 and 34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15 and 31* is/are allowed.

6)☐ Claim(s) *8-14, 16, 24-30, 32, 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Examiner's responses to Applicant's remark

1. Applicants' arguments filed on 6/3/2004 have been fully considered. Applicant's arguments with respect to claims 8, 24, and 34 have been considered but are moot in view of the new ground(s) of rejection due to the amendments.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 8, 10, 13-14, 24, 26, 29-30, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Das et al. (US patent 5,896,176 cited previously) in view of Krishnamurthy et al. (US patent 6,496,607.)

a. Das teaches an image encoding apparatus for performing intra-frame encoding of image signals of a plurality of frames, (column 12, lines 65-68; column 14, lines 37-68; a plurality of I frames) comprising:

-- input means for inputting an image signal including pixel values of a frame; (the input of video frames in Fig. 12)

-- transformation means for applying a discrete wavelet transform to the image signal of each frame and outputting transformed coefficients of each frame; (column 5, lines 45-58;

column 11, lines 33-54; column 13, lines 38-62; column 12, lines 65-68; column 14, line 37 to column 15, line 20)

-- motion detection means for detecting motion of an image based upon the image signal of plurality frames; (column 5, line 59 to column 6, line 7; column 7, line 18 to column 8, line 8)

-- region designation means for designating a region of the image of the frame based upon information indicating motion of the image detected by said motion detection means; (column 8, lines 9-41)

-- quantization means for quantizing the transformed coefficients of each frame in accordance with the region designated by said region designation means and outputting a quantized image signal; (column 11, line 64 to column 12, line 19; column 13, lines 38-62)

-- wherein, upon encoding of each frame, the transformed coefficients of each frame are independent of pixel values of other frames; (column 14, line 37 to column 15, line 20; Encoding of I frames doe not rely on other frames.)

-- encoding means for encoding the quantized image signal quantized by said quantization means; (column 13, lines 38-62)

-- wherein said motion detection means detects motion of the image in accordance with a difference between pixel values of corresponding pixels in two successive frames of the image signal; (column 5, line 59 to column 6, line 7; column 7, lines 19-39)

-- wherein said region designation means designates a region of the image based upon the information indicating motion of the image output by said motion detection means; (Figs. 5a-5d; column 8, line 20-41; Inside the rectangle shown in Fig. 5d, the motion region is indicated by 1.)

-- wherein said region designation means designates a region of the image not contained in the information indicating motion of the image output by said motion detection means. (Figs.

5a-5d; column 8, line 20-41; The (x0, y0) and (x1, y1) also designate region outside a rectangle in which the motion information is indicated.)

The above passages also teach the corresponding features recited in method Claims 24, 26, and 29-30.

Das also teaches memory that store instruction to implement the steps of the method recited in Claim 24. Therefore, it also teaches the corresponding features recited in Claim 34.

b. However, Das does not explicitly teach quantization means for quantizing the transformed coefficients of each frame, which is an I frame, so as to differentiate an image quality of an image as recited.

c. Krishnamurthy teaches a method and system comprising:

-- quantization means for quantizing the transformed coefficients of a frame so as to differentiate an image quality of an image of an region designated as ROI. (column 4, lines 8-32; column 6, lines 13-37; the ROI being quantized finer than non-ROI to differentiate an image quality)

d. Das further teaches that object scalability and quality scalability for selectively maintain quality of various objects (such as ROI) in compression of images. (column 2, lines 13-36) It is desirable to be able to efficiently allocate coding to differentiate ROI from non-ROI. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to use Krishnamurthy's quantization approach to quantize Das' objects (ROI) and background (non-ROI) with separate quantization scales, respectively, because this replacement efficiently allocates coding resource. The combination thus teaches:

-- quantization means for quantizing the transformed coefficients of each frame so as to differentiate an image quality of an image of an region designated by the region designation means from an image of other regions, and outputting a quantized signal.

4. Claims 9 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Das and Krishnamurthy as applied to Claims 8 and 24, and further in view of Kanda et al. (US patent 5,523,850 cited previously.)

The combination of Das and Krishnamurthy teaches the parental Claims 8 and 24 as discussed above. Das teaches detecting motion objects based on difference of pixel values between two adjacent frames as discussed above. However, the combination of Das and Krishnamurthy does not teach features related to a difference between pixel values of two vertically adjacent pixels recited in Claims 9 and 25.

Kanda teaches a system and method includes motion detection comprising feature of:

-- motion detection means that detects motion of the image in accordance with a difference between pixel values of two mutually adjacent pixels vertically of the image signal. (Fig. 5; column 6, lines 25-40; In the field format, pixel c is above x and x is above d vertically.)

It is desirable to apply a coder to many video formats including an interlaced format having data stored and displayed as even and odd fields because it broadens application of the coder. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to extend Das' coder to interlaced video data by replacing Das' frame difference with Kanda's field difference for detecting moving pixels, because this replacement makes this extension possible and thus broadens application of the coder.

5. Claims 11 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination Das and Krishnamurthy as applied to Claims 8 and 24, and further in view of Yoneyama et al. (US patent 6,025,879 cited previously.)

The combination of Das and Krishnamurthy teaches the parental Claims 8 and 24 as discussed above. Das further teaches detecting motion objects on a block basis. However, the combination Das and Krishnamurthy does not teach features related to detecting moving objects based on motion vectors recited in Claims 11 and 27.

Yoneyama teaches a system and method for detecting moving object in a coding process including a wavelet transform (column 10, lines 6-18) comprising features of:

-- forming the image signal into blocks and calculating motion vectors on a block-by-block basis; (Fig. 7A and 7B teaches that motion vectors are formed in a block-by-block basis.)

-- detection means for detecting motion of the image based upon whether magnitude of a motion vector calculated by said block calculation means is greater than a predetermined value. (Figs. 15 and 16; steps S41, S42, and S51)

It is desirable to detect a moving object quickly and accurately in object-based image compression. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Yoneyama's motion vector-based moving object detection to detect moving objects for wavelet compression taught by the combination Das and Krishnamurthy because the combination improves detection of a video object.

6. Claims 12, 16, 28, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination Das and Krishnamurthy as applied to Claims 8 and 24, and further in view of Chen et al. (US patent 6,263,022 cited previously.)

The combination of Das and Krishnamurthy teaches the parental Claims 8 and 24 as discussed above. Das further teaches scalable compression based on regions of interest. (column

12, lines 43-52; column 14, lines 23-35) However, the combination Das and Krishnamurthy does not teach features related to quantization recited in the above-listed claims.

Chen teaches:

-- a quantization means performs quantization upon raising quantization precision of an image region designated as region of interest; (Fig. 2; column 6, lines 26-52; column 7, lines 36-54; Bitplane shifting raises quantization precision. A video object is a region of interest.)

-- an encoding means decomposes a data sequence, which supplied from said quantization means, into bit planes, applies binary arithmetic encoding on a per-bit-plane basis and outputs code sequences giving priority to code sequences that correspond to bit planes of higher order bits. (coder 250 of Fig. 2; column 2, lines 17-42; column 6, line 53 to column 7, line 6)

It is desirable to have quality scalability for video signal. As explained by Chen, up-shifting the bit plane for a region of interest provides the scalability because data of the region of interest is coded, transmitted, and decoded before a background region. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Chen's bit-plane compression to code Das quantized wavelet data because the combination provides quality scalability for video signal based on video objects.

Allowable Subject Matter

7. Claims 15 and 31 are allowed.

The statement of reasons for the indication of allowable subject matter has been provided in paper #8.

Conclusion

8. THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). The Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for response to this final action is set to expire THREE MONTHS from the date of this action. In the event a first response is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event will the statutory period for response expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 703 306-2796. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703 308-7452. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications. TC 2600's customer service number is 703-306-0377.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 305-4700.

Wenpeng Chen
Examiner
Art Unit 2624

August 19, 2004